

trary to general belief, a place for teaching physical science practically was not necessarily a very costly affair. Shenstone while with me assisted in various lines of experimental research, and after leaving was good enough to return and devote a whole month of the summer holidays to work in the laboratory. In those days no science master who had ambition to be more than a teaching machine could refresh his own mind or take part in the advancement of his subject save at the sacrifice of recreation, health, and pocket; and the pity of it is that times are not greatly altered in this respect.

In 1880 Shenstone was appointed chief science master at Clifton, and, spite of heavy routine, he managed to carry out admirable and difficult work on ozone, and on the properties of certain highly purified substances, from which he drew the important conclusion that in certain cases two elements can unite together without the presence of that minute quantity of a third substance which had been supposed by some chemists to be invariably necessary.

Shenstone was a skilful glass-blower and an excellent popular lecturer. He was instrumental in introducing vitrified silica as a material for making tubes, flasks and other vessels for laboratory use which are now manufactured in a clear form by Messrs. Johnson and Matthey. The production of this material was described by Shenstone in a lecture at the Royal Institution in 1901.

He died on February 3, after a long illness, at Mullion, South Cornwall, aged fifty-eight; and there he lies in the old churchyard within sight of the Cornish sea, which he so much loved.

Shenstone married in 1883 Mildred, daughter of the late Rev. R. N. Durrant, of Wootton, Canterbury, who survives him, together with a son and daughter.

WILLIAM A. TILDEN.

NOTES.

At the annual general meeting of the Royal Astronomical Society to be held to-morrow (Friday) the president will deliver an address on presenting the gold medal of the society to Sir David Gill, K.C.B., F.R.S., to whom it has been awarded for his contributions to the astronomy of the southern hemisphere and his other astronomical work.

THE Dublin meeting of the British Association will be held on September 2-9 under the presidency of Mr. Francis Darwin, F.R.S. The sectional presidents are as follows:—A, Dr. W. N. Shaw, F.R.S.; B, Prof. F. S. Kipping, F.R.S.; C, Prof. J. Joly, F.R.S.; D, Dr. S. F. Harmer, F.R.S.; E, Major E. H. Hills, C.M.G.; F, Lord Brassey, K.C.B.; G, Mr. Dugald Clerk; H, Prof. W. Ridgeway; I, Dr. J. S. Haldane; K, Dr. F. F. Blackman, F.R.S.; L, Prof. L. C. Miall, F.R.S. There will also be a subsection of Section F, to be concerned with agriculture, and the chairman will be Sir Horace Plunkett, K.C.V.O., F.R.S. The first evening discourse will be delivered by Prof. H. H. Turner, F.R.S., on "Halley's Comet," and the second by Prof. W. M. Davis, of Harvard University, on "The Lessons of the Colorado Cañon."

THE death is announced, at the age of eighty-seven, of the Rev. F. Howlett, whose drawings and observations of sun-spots have appeared in various publications, and will be remembered by many students of solar physics.

THE thirty-fifth annual dinner of old students of the Royal School of Mines will be held on Wednesday, March 18, at the Hotel Cecil. The chair will be taken by Dr. R. Pearce.

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THE Mary Kingsley medal, which was struck by the Liverpool School of Tropical Medicine for presentation to distinguished investigators and others who have aided the cause of combating disease in the tropics, has been presented to Lord Lister, who formally opened the school on April 21, 1899. The medal was forwarded to Lord Lister with a letter signed by Princess Christian (hon. president), Sir Alfred Jones (chairman), Sir Rubert Boyce (dean), and Mr. Alan Milne (secretary), in which it was stated:—"No words of ours are required to amplify the esteem in which your magnificent achievements are held throughout the world. The Mary Kingsley memorial medal has been founded for the purpose of recognising the work of those who have accomplished much in the cause of tropical medicine. No one has accomplished more for this cause, or, indeed, for the whole cause of medicine, than yourself. The school feel honoured that your lordship has consented to receive the medal."

WE regret to learn from the *City Press* that Mr. R. J. Friswell, whose name is well known among analytical chemists, died on February 6 after a brief illness. Mr. Friswell studied at the Royal College of Chemistry under Sir Edward Frankland, and later acted as assistant at St. Mary's Hospital to Dr. W. J. Russell. Subsequently he engaged in research work at the Royal College, being appointed in that connection on the staff of the Indian Eclipse Expedition, and later, on his return to London, continuing to assist Sir Norman Lockyer in his spectroscopic researches. Afterwards, for many years, he was the chief chemist to the firm of Brooke, Simpson, and Spiller, leaving them to become the scientific adviser of the British Uralite Company, Ltd. For the last few years he had been in practice for himself as an analytical chemist in Great Tower Street. Mr. Friswell was elected a Fellow of the Chemical Society in 1871, and served on the council for several years; he was one of the founders of the Institute of Chemistry, and last year was chairman of the London section of the Society of Chemical Industry.

WE notice with regret the announcement that Sir J. D. Macdonald, K.C.B., F.R.S., retired Inspector-General of Hospitals and Fleets, died at Southall on February 7 in his eighty-first year. Sir J. D. Macdonald entered the Royal Navy as an assistant surgeon in 1849, and was placed in charge of the Plymouth Hospital Museum. In 1852 he joined H.M.S. *Herald*, and from that date until July, 1859, when promoted to surgeon, he was employed on surveying and exploring service in the south-west Pacific. After many years of almost unremitting microscopic work on the products of the sounding-lead, dredge, and towing-net, he was elected a Fellow of the Royal Society. His next promotion came in 1866, and for nine years he held the post of professor of naval hygiene at the Netley Medical School. In the meantime he was awarded the Macdougall-Brisbane medal of the Royal Society of Edinburgh in 1862, and the Gilbert Blanc medal in 1871. He was the author of numerous papers read before the Royal Societies of London and Edinburgh and other societies. His published works also included "A Guide to the Microscopical Examination of Drinking Water," "Analogy of Sound and Colour," and "Outlines of Naval Hygiene." He was made a Deputy-Inspector-General of Hospitals and Fleets in February, 1875, and five years later was again promoted, holding from 1883 to 1886, when he retired from active service, the charge of the Naval Hospital at Stonehouse. In 1902 he was made a K.C.B.

THE February number of the *Strand Magazine* contains two articles of interest to readers of NATURE. In the one,

entitled "The Physiognomist at the Zoo," Mr. A. E. Johnson discourses pleasantly on the expression of animals as an indication of character, his points being brought out by four striking—if somewhat accentuated—portraits of the lynx, the chimpanzee, the mantled guereza monkey, and the loris. The second article, by Mr. D. M. Beddoe, is devoted to the recently discovered mummy believed to be that of Menephtah, the Pharaoh of the Exodus, and the son of the great Rameses. Photographs of the mummy illustrate the article, so that the reader may look on features familiar to Moses some three thousand or more years ago.

In the January number of the *Quarterly Journal of Microscopical Science* Mr. C. C. Dobell describes the life-history and development of a newly discovered genus and species of flagellate monad (*Copromonas subtilis*) inhabiting the faeces of frogs and toads. Starting with the adult monad, it appears that the organism undergoes two distinct phases or cycles of development, one asexual and the other sexual. In the former multiplication takes place by means of longitudinal division, with the eventual development of two flagellas and two nucleuses. In the sexual stage the monads conjugate in pairs, and thus eventually give rise to a dormant cyst, from which, when a suitable nidus is reached, a small hyaline monad is liberated, this in due course developing into an adult monad, when the whole cycle recommences. The cysts are swallowed by frogs or toads, and reach the rectum by the usual course.

THE anatomy and histology of the alimentary tract of the dugong are described in detail by Mr. J. F. Guder-natsch in the fourth part of vol. xxxvii. of *Gegenbaur's Morphologisches Jahrbuch*. At the conclusion of the paper the author refers to some curious resemblances between the sirenian and the cetacean tongue. In that organ in the dolphin there have, for instance, been found certain peculiar pits occupying the position of the circumvallate papillæ in other mammals, while the author has discovered very similar pits in the dugong which occupy the position of the foliate papillæ. Whether these pits are connected with the sense of taste is, however, uncertain, although the occurrence in both cases of ganglionic cells in the pits is in favour of such a function. An important difference between the sirenian and cetacean mouth is the presence in the former of large salivary glands, which are totally wanting in the latter.

A SERIES of "studies in adaptation" commences in the fifth volume of the *Baltimore Journal of Experimental Zoology* with an article by Dr. Alexander Petrunkevitch on the sense of sight in spiders, a subject discussed with great elaboration and in minute detail. This sense is of the greatest importance to certain species, those which obtain their prey by hunting depending entirely on sight during the chase. Nevertheless, the acuteness of vision even in the sharpest-eyed spiders is far inferior to that of man. An insect of about a square centimetre in size would, for example, be perfectly visible—even perhaps to the extent of specific recognition—to the human eye at the distance of a yard, whereas to a spider of the genus *Phidippus* it would appear as a tiny, ill-defined moving object, while to members of the genus *Lycosa* it would be invisible. The poor visual power of spiders is largely due to the peculiar form of the retina, while the inferiority in this respect of *Lycosa* to *Phidippus* depends on the fact that, while in the latter the retinal image covers the terminations of nearly seven nerve-rods, in the former it scarcely exceeds the diameter of a single rod.

THE best mode of determining the age and rate of growth of eels forms the subject of a long article by Mr. K. J. Gernsøe in the report of the Danish Biological Station for 1906 (Copenhagen, 1908). By means of measurements, it has been ascertained that when eels attain a length of about 18 cm. and begin to develop scales, they have lived for two years in fresh water, that is to say, from the time of their arrival as larvæ or glass-eels. After this the age may be determined by the number of concentric zones or rings in the scales, which indicate annual periods of growth. The age of any individual eel is therefore the age of the scale + 2. Judged by this test, it appears that in the case of males some assume the silvery breeding-dress (preparatory to descending to the ocean) in about $4\frac{1}{2}$ years after their arrival in fresh water, although the majority do not do so until from $5\frac{1}{2}$ years to $7\frac{1}{2}$ years. The females, on the other hand, assume the silver livery somewhat later, scarcely ever before $6\frac{1}{2}$ years, and in most cases not until $7\frac{1}{2}$ years, while many do not do so until they are $8\frac{1}{2}$ years old or even more, whereas only one male of that age was detected in the course of the experiments. It is during their fourth and fifth years that eels increase most rapidly in girth.

IN an article on the evolution of life, published in the *Century Illustrated Magazine* for February, Dr. Percival Lowell asserts that life is an inevitable phase of planetary evolution, and consequently that every planet must be inhabited by living creatures of some kind during a certain stage of its existence. Mars is at present passing through this stage. The author also considers it demonstrated that in the case of our own planet life originated in the ocean. Very picturesquely does he describe the life of the deep sea. That a blind fauna, he writes, should inhabit the abyssal depths is of itself a sufficiently wonderful phenomenon; but that nature should undertake to light the region, and that by means of its inhabitants, is still more wonderful. And yet "this is precisely what she does, and with something akin to electricity, each animal carrying with it its own machine. Whole tracts are brilliantly lighted up, till they must resemble London or Paris by night, only that in these thoroughfares of the abysses of the sea the passers-by provide the illumination."

PROF. DUNBAR, as the result of a series of experiments conducted over a long period and with every care, has come to the conclusion that the bacteria are not an independent group of organisms, but, together with some of the yeasts and moulds, are stages in the life-history of green algæ ("Die Entstehung von Bakterien, Hefen und Schimmelpilzen aus Algenzellen," published by R. Oldenbourg, Munich and Berlin). A pure culture of a single-celled alga belonging to the *Palmellacia* was obtained, but by modifying the culture medium by the addition of acid, alkali, or traces of copper salts, other organisms, generally bacteria, occasionally moulds and yeasts, and even spirochætes, made their appearance in the pure cultures. Granting there was no flaw in the experimental methods, and every care seems to have been taken to exclude contamination, the results are susceptible of another explanation, viz. that the secondary growths were derived by transformation of the algal cells, in fact, by the phenomenon of "heterogenesis," which has been claimed by Bastian to occur with certain organisms.

AN editorial in the *Indian Forester* (November, 1907) on "Forestry and Agriculture," advocating the afforestation of some of the large areas of uncultivated or unculturable land in India, touches on a matter of great importance, seeing that so much timber is required as fuel.

It is suggested that the planting of such areas might be undertaken by district boards working in consultation with forest officers.

A PAMPHLET on the fibrous plants of the west coast of Africa, forming the subject of a paper read before the Liverpool Chamber of Commerce by Dr. E. Drabble, has been received from the Liverpool Institute of Commercial Research in the Tropics. The author treats his subject under the groups of leaf fibres, bast fibres, piassavas, and raffias. The first named include species of Agave, Sansevieria, and the oil palm *Elæis*; most of the bast fibres are derived from malvaceous plants; the greater quantity of both piassavas and raffias is obtained from the palm *Raphia vinifera*.

AN account of culture experiments undertaken with the object of studying the effect of organic matter on nitrification in impure cultures is contributed to the *Bulletin International de l'Académie des Sciences de Cracovie* (June, 1907) by Messrs. A. Karpinski and B. Niklewski. The authors come to the conclusion that weak solutions of various organic substances, especially humates, and to a less degree acetates, peptone, and sugar, do distinctly promote nitrification processes. Messrs. T. Koźniewski and L. Marchlewski communicate a paper on chlorophyll derivatives, in which they indicate the spectra obtained with solutions of phyllotaonin and allophyllotaonin.

THE first number of the *Kew Bulletin* for the current year contains diagnoses of new flowering plants, "Decades Kewenses: XLV., XLVI.," by workers in the herbarium, and identifications by Mr. G. Massee of a set of fungi collected in Singapore by Mr. H. N. Ridley. The majority of the fungi are agarics, of which several are new species; a *Calodon* (Hydnaceæ) and a *Geoglossum* also furnish new species. An article on the fruit fly, *Ceratitis capitata*, refers to a pest that has caused serious damage to orange bushes and fruit trees in South Australia and other colonies. It has also been reported from the neighbourhood of Paris on apricots and peaches. Kerosene placed in shallow vessels is said to provide an attractive lure that has proved efficacious. Mr. T. A. Sprague contributes a synopsis of the prickly fruited species of *Euonymus*, of which three are new Chinese plants, and an article by Mr. F. Turner on Australian grasses is reprinted.

THE first of a series of contributions by Mr. T. F. Cheeseman to a fuller knowledge of the flora of New Zealand, constituting an addendum to the author's "Manual," is published in the Transactions of the New Zealand Institute (vol. xxxix.). As a guide for future work, the author indicates the regions that have been insufficiently explored. The notes refer chiefly to new varieties and specimens. The indigenous localities of the handsome shrub *Clianthus puniceus* and the myrtaceous tree *Metrosideros tomentosa* are collated. Illustrations are given of two unique specimens of branched "nikau" palms, *Rhopalostylis sapida*, one showing seventeen irregular branches. Separate papers are devoted to the description of a plant previously named *Trithuria inconspicua*, now transferred to *Hydatella*, another genus of the same order, Centrolepidaceæ, and to the discussion of the discontinuous distribution of *Pittosporum obcordatum*.

LAND erosion by storm water appears to be going on at a remarkably rapid rate in parts of Cape Colony, and to cause considerable loss to farmers and others. For the past three years the Irrigation Department has been collecting information on its bad effects and on possible remedies, and this is now summarised in the November (1907) number

of the *Agricultural Journal of the Cape of Good Hope*. It is considered that two main causes operate—the burning of forest, of bush, and of grass has destroyed vegetation that used to hold back storm water, and the movement of cattle and waggons, &c., along definite paths tends to wear down tracks in which the water can start its course. Once erosion begins its progress is very rapid. Among the instances quoted we may mention the Ongers or Brak River. Sixty years ago there was no river, but for some cause erosion began, and it has since gone on so rapidly that the river channel is now generally 300 feet wide and 15 feet deep. In order to check the process it is suggested that small channels or "sluits" should be so obstructed by stones, bushes, &c., that the water must distribute itself over a wider area, and do correspondingly less damage. The subject is a very important one, and we trust that the Irrigation Department will not stop at collecting information, but will proceed to a sound and complete investigation of the whole matter.

THE Bulletin of the American Geographical Society, vol. xxxix., No. 11, contains an account of physiographical experiments on the aggrading and degrading stream, carried out at the Ohio State University during the past year. An initial valley of cement was constructed in a water-tight tank, the slope of which could be varied. Fire-clay of unequal fineness was placed above the upper end of the valley, and a fine spray of water turned on. During the aggradation process, the construction of systematic asymmetrical fans over previous flood plain deposits, and the formation and preservation of pits or depressions on the flood plain, were noticed. The latter is the probable origin of the so-called "kettles" of the Susquehanna. Conclusions were also arrived at concerning the relative importance of slope, water supply, and load as causes of the aggradation or degradation of streams, the influence of load being specially emphasised. Finally, Prof. Davis's explanation of alluvial terraces standing above existing flood plains was strikingly confirmed by the action of the experimental river as it carved out its series of terraces.

AN account of the astronomical and geodetical observations made in 1902-5 by the German Commission for fixing the boundaries of German East Africa appears in *Die Mitteilungen aus den deutschen Schutzgebieten*, vol. xx., part iv. The report is published in three divisions, the first containing particulars of the Lake Kivu Expedition under Captain Herrmann, with Prof. Lamp as astronomer, and the second and third giving the results of the Deutsche Uganda Grenz Expedition under Captain Schlobach. On the Kivu Expedition, Prof. Lamp established an astronomical station at Usambara, and determined a value for its latitude. Valuable geodetical results, of which full tables are given, were also obtained in this neighbourhood, and with the figures of Captain Schlobach furnish the data for triangulation of a map of the district west and north of Lake Victoria. East of the lake, triangulation was continued from a base at Port Florence, the work being carried as far as Kilimanjaro, and from thence connected with Zanzibar. A map is published showing the boundary line between British Uganda and German East Africa from Lake Victoria to Kilimanjaro. Captain Herrmann also gives an account of altitude measurements made by the Kivu Expedition, and Captain Schlobach a table of those made during the Uganda Grenz Expedition.

THERE are few regions in the world so rich in minerals as the State of Nevada. In addition to gold, silver, copper and lead, deposits of sulphur, zinc, bismuth, antimony, tungsten, nickel, iron, mercury, arsenic, salt.

and gem-stones are being developed at the present time. The discovery of the great Tonopah gold mine in one of the barren mountains in the desert area of the State caused Nevada to awake from the economic lethargy into which she was plunged after the flooding of the Comstock mines in the early 'eighties, and the closing down of nearly every mine of importance on the other mining fields through the fall in the price of silver. In an interesting review of the recent mining developments in Nevada, Mr. A. Selwyn-Brown, in the *Engineering Magazine* (vol. xxxiv., No. 4), shows that since the Comstock rush in 1850 to the end of 1907 the gold and silver mines of the State yielded the enormous value of 206,670,000*l.* In the *Journal of the Franklin Institute* (vol. clxv., No. 1) Prof. O. C. S. Carter also deals with the mineral resources of Nevada, and describes the irrigation started by the Government Reclamation Service. The irrigation canal, thirty-one miles in length, to divert water from the Truckee River to the Carson River, together with 270 miles of lateral ditches, is completed, and is the first irrigation project carried out under the authority of the United States law of June 17, 1902.

In the December (1907) number of the *National Geographic Magazine*, the organ of the National Geographic Society of Washington, U.S.A., Mr. R. M. Brown describes an experiment intended to give practical proof of the curvature of the earth, carried out by him on Lake Quinsigamond, on the model of the well-known investigations of Mr. H. Yule Oldham on the Bedford Level in this country. The most interesting contribution is that of Hon. J. Wilson, Secretary of Agriculture, entitled "The Modern Alchemist," in which he surveys the multifarious activity of his department in the introduction of new varieties of cereals and other useful plants, arboriculture, forestry, fisheries, and many other subjects.

MR. F. SODDY is giving a course of six free public lectures at Glasgow University on "The Nature of Matter." He regards them as some slight return to the people of Glasgow for the help given to the University by prominent citizens, especially in the equipment of the department of physical chemistry with apparatus for research, and he believes it to be the duty of men of science who receive such help to place before the public from time to time, and in a manner to be readily comprehended, the principal results achieved. The first lecture, delivered on January 30, dealt with radium and atomic disintegration.

SIR CHARLES TODD has issued the meteorological observations made at the Adelaide Observatory and other places in South Australia and the Northern Territory during the year 1905. The section relating to rainfall gives the monthly and yearly totals at 517 stations, and compares the figures with the average for previous years wherever there are at least seven years' records. The year was a moderately wet one over the older established agricultural districts, but dry over the pastoral country, the interior, and the Northern Territory. From August to the middle of December the weather was very cold in the southern areas; the special meteorological feature of the year was the exceptionally cold spring; February was also the coldest month on record. The useful experiments on the exposure of thermometers have been continued; Sir Charles Todd observes that, as might be expected, the thermometers in the "Stevenson" screens as a rule read higher than those on the "Greenwich" stand during the night and lower during the day; the difference depends very much on the wind-force and the state of the sky. An interesting table shows the approximate mean rainfall

for each month and year from 1861 to 1905, and the average yield of wheat per acre; wheat-growing can be successfully prosecuted only where the percentage of winter rains is largely in excess of that for the summer months.

M. L. NATANSON has an article on the electromagnetic theory of dispersion in gases in the April (1907) number of the *Bulletin de l'Académie des Sciences* of Cracow. After working out the general theory of propagation of electrical disturbances in a medium composed of molecules which contain electrons or "corpuscles" having their own periods of oscillation, he limits his consideration to gases, and assumes the molecules to contain electrons of one kind only. He finds that in the cases of hydrogen, oxygen, air, and carbon monoxide, the values of the refractive indices calculated on this assumption agree fairly with the values found by experiment. In the case of carbon dioxide the agreement is poor, owing probably to the influence of the absorption bands in the infra-red. In the case of sodium vapour the assumption of two kinds of electrons fails to produce a satisfactory agreement between theory and experiment.

PROF. COHEN has made valuable additions to our knowledge of the allotropic states of the elements, notably in the cases of tin and antimony, and the current number of the *Zeitschrift für physikalische Chemie* (January 31) contains two papers by him (in collaboration with Mr. J. Olie) on the so-called amorphous antimony and bismuth. These were described by Mr. F. Hérard in 1888 as resulting from the action of nitrogen upon these metals at a dull red heat. The experiments now described prove conclusively that neither pure antimony nor bismuth undergoes any change when heated in nitrogen which has been carefully purified from oxygen and oxides of nitrogen. If the nitrogen is not specially purified, however, Hérard's results are reproduced, the "amorphous" antimony (or bismuth) thus obtained consisting of a mixture of the metal and its oxide. These allotropic modifications of the two elements are therefore non-existent.

UNDER the title "A propos de l'État civil de Jean Baptiste van Helmont" the question of the correct dates of the birth and death of van Helmont is discussed by the Chevalier Edmond Marchal in a recent number of the *Bulletin of the Royal Academy of Belgium* (1907, No. 7, p. 732). The researches of M. G. Des Marez among the registers of the cathedral church of Ste. Gudule, Brussels, show that van Helmont was born, not in 1577, as has been generally supposed hitherto, but on January 21, 1579 (N.S.). The date of his death is somewhat less certain, being either November 16, 1635, or December 30, 1644; it appears to be clear, however, that he died in Brussels and not at Vilvorde, where he spent seven years of his life. It is an interesting fact that the bust of van Helmont at the Royal Belgian Academy of Medicine does not represent Jean Baptiste van Helmont at all, but his son François, whose likeness, appearing side by side with that of his father in the first edition of the "*Ortus Medicinæ*," was confused with it when the bust was carved in 1863.

MESSRS. LONGMANS, GREEN AND CO. have published a fifth edition of "The Old Riddle and the Newest Answer," by Father John Gerard, S.J. The price of the book is 6*d.*

THE publishing firm of B. G. Teubner, Leipzig and Berlin, has just issued an authorised translation into German, by Dr. J. Friedel, of Prof. Horace Lamb's standard work on "Hydrodynamics." The second English edition was reviewed in *NATURE* of November 21, 1895 (vol. liii., p. 49), and the third edition, carefully revised and largely

supplemented, was published early in 1906. This is the edition of which a translation has now appeared in Teubner's collection of text-books of mathematical science.

The fifth volume of the second series of the Proceedings of the London Mathematical Society has now been published by Mr. Francis Hodgson. The volume includes an account of the meetings held during the session November, 1906, to June, 1907, and many of the papers read before the society during the session. Obituary notices are included of the late Colonel Mannheim and Dr. E. J. Routh. As the meetings of the society are recorded from time to time among our reports of societies and academics, it is unnecessary to do more now than mention the publication of the volume containing records of papers presented.

OUR ASTRONOMICAL COLUMN.

OCCULTATIONS OF URANUS IN 1908.—From Dr. Downing we have received, as an excerpt from No. 2, vol. lxxviii., of the Monthly Notices, a table showing the times and angles of immersion and emersion for the occultations of Uranus by the moon observable at British observatories during the present year. The places specifically named are Adelaide, Melbourne, Sydney, Wellington, Natal, Perth (W.A.), and the Cape, and the dates of the occultations are April 22, May 19, July 13, August 9, and October 3. Dr. Downing hopes that the publication of these data will enable astronomers favourably situated to observe some peculiarities in the appearance of the planet at the time of occultation.

OBSERVATIONS OF COMETS 1907*d* AND 1907*e*.—The results of the observations of comets 1907*d* and 1907*e*, made at the Vienna Observatory with the 6-inch refractor, are recorded by Dr. J. Holtschek in No. 4231 (p. 99, February 3) of the *Astronomische Nachrichten*. Some of them for 1907*d* are particularly interesting, as, in addition to the brightness of the nucleus and of the comet as a whole, the observer gives the length of tail and the times before sunrise up to which the comet was observable. Thus on July 18, when the brightness of the whole comet was of the fourth magnitude, the brightness of the nucleus being 7.5 mag., the object was followed until 15h. 33m. (Vienna M.T.), that is, until 46m. before sunrise. On August 26, mag. 2.0, it was seen until 20m. before sunrise. The greatest length of tail measured was about 8°, on August 18.

Signor Abetti also records, in the same journal, a number of observations, made at the Arcetri Observatory, of these two objects during November and December, 1907.

PLANETS NOW VISIBLE.—With Mercury at its greatest eastern elongation on February 13, it may be possible, during the next night or two, to observe, with the naked eye, five of the major planets at the same time. On February 13 Mercury will set about 1½ hours after the sun, i.e. at about 6.30 p.m., some 10° south of west. Venus is still quite a bright object in the western sky, whilst Saturn sets, nearly due west, some three hours after sunset. Mars does not set until about 10.30 p.m., and is to be found in the constellation Pisces to the south-east of the Great Square of Pegasus.

At 6 p.m. Jupiter is now a striking object in the eastern sky, having risen some three hours earlier.

Mercury will, of course, be the most difficult object to locate, but, following the directions given in these columns on December 5, 1907 (p. 115, vol. lxxvii.), Mr. W. E. Rolston found the planet at 6.35 a.m. on December 6, and was able to follow it easily until 7.10 a.m. The observation was made at Wimbledon Park, the sky being clear and the sun rising at 7.51 a.m.

At present Uranus is in conjunction, and therefore invisible, but Neptune may be found, with a telescope, situated between the stars ϵ and ζ and near to η Geminorum.

ENCKE'S COMET, 1908*a*.—The following is a further extract from the ephemeris for Encke's comet given in

No. 4222 (p. 363, December 18, 1907) of the *Astronomische Nachrichten* by M. Kamensky and Mdlle. Korolikhov:—

Ephemeris oh. (M.T. Berlin).

1908	a (app.) h. m.	δ (app.)	1908	a (app.) h. m.	δ (app.)
Feb. 12 ...	23 50'3 ...	+6 21'0	Mar. 3 ...	0 27'0 ...	+10 4'5
„ 20 ...	0 3'9 ...	+7 43'7	„ 7 ...	0 35'6 ...	+10 56'1
„ 28 ...	0 18'9 ...	+9 15'3	„ 11 ...	0 44'7 ...	+11 49'6

From this we see that the comet is apparently travelling in a north-easterly direction through the constellation Pisces, and should be sought, in the earlier part of the evening, some few degrees to the south of the Great Square of Pegasus. Its photographic magnitude on January 19 was 12.5, and its distance from both the sun and the earth is decreasing rapidly. According to Prof. Wolf's observations, the above ephemeris required corrections of +2.4m. and -24' on December 25.

Some interesting notes on the successive reappearances of Encke's comet appear in No. 2 (February 1, p. 13) of the *Gazette astronomique*.

A CATALOGUE OF ZODIACAL STARS.—A catalogue of zodiacal stars, principally prepared for use in occultations of stars by the moon, appears as part iii., vol. viii., of the *Astronomical Papers* prepared for the use of the American Ephemeris and Nautical Almanac. This catalogue was prepared by Mr. H. B. Hedrick, and all the catalogues employed in the investigation were reduced to the same absolute system as Prof. Newcomb's Catalogue of Fundamental Stars, which appeared as part ii. of the same volume. The catalogue includes 1607 stars, and gives the definitive positions for the epochs 1900.0 and 1920.0. Centennial and secular variations and proper motions are also given.

METEORS OBSERVED ON JANUARY 2.—Observing at Hjørring, North Jutland, Herren P. Muusmann and H. Wanning saw a number of meteors in the region between Cygnus and Pegasus on January 2. The observations were made between 8.10 and 8.20 p.m., and during the last five minutes more than thirty meteors were counted. The position of the radiant is given as 300° + 61° (*Astronomische Nachrichten*, No. 4230, p. 95, February 1).

THE WINDS OF NORTHERN INDIA.¹

THE phenomena of atmospheric motion may be considered and discussed from three main points of view. They may be (1) regarded in their relation to the general system of winds prevailing over a rotating earth unequally heated, and having an annual period of temperature variation; (2) considered in their dynamic relation to the synchronous distribution of the various other meteorological elements, more particularly the pressure and temperature, in their vicinity; (3) arranged in order to facilitate comparison with one another at different times and seasons, and to exhibit the connection between wind and climatic conditions in such a way as to enable account to be taken of this connection in a general survey of meteorological conditions and in relation to forecasts. In the memoir before us, the main feature is the development and discussion, from the third standpoint, of the results of anemographic records at Allahabad and Lucknow during the years 1890-1904 and 1878-1892 respectively. Sir John Eliot prefixes the discussion by a short account of the synchronous distribution of pressure and temperature at Lahore and Allahabad, which is very suggestive of the method to be adopted and the results to be used in a discussion from the second standpoint. The modifying influences of the orographic distribution are too considerable to admit of close connection between the results recorded and the general atmospheric circulation, and no attempt has been made to develop such connection.

¹ "Memoirs of the Indian Meteorological Department, being Occasional Discussions and Compilations of Meteorological Data relating to India and the Neighbouring Countries." Published under the direction of Dr. G. T. Walker, F.R.S. Vol. xviii., part iii. V. A Discussion of the Anemographic Observations recorded at Allahabad from September, 1890, to August, 1904. VI. A Discussion of the Anemographic Observations recorded at Lucknow from June, 1878, to October, 1892. By Sir John Eliot, K.C.I.E., F.R.S. (London: Harrison and Sons, 1907.) Price 2 rupees.